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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KRECK, JOHN J

ART UNIT	PAPER NUMBER
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3673

DATE MAILED: 05/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/841,061

Applicant(s)

BERCHENKO ET AL.

Examiner

John Kreck

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2424-2426, 2430-2449, 2457, 2458, 2460 and 2461 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2424-2426, 2430-2449, 2457, 2458, 2460 and 2461 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6, 7, 12, 14 6) ☐ Other:

### **DETAILED ACTION**

The amendment dated 4/1/02 has been entered.

Applicant's election without traverse of claims 2424-2426, 2430-2449, 2457-2458, and 2460-2461 in Paper No. 13 is acknowledged.

#### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Drawings***

2. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 3/11/2002 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

#### ***Double Patenting***

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

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1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 2424-2449; 2457-2458; and 2460-2461 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending applications (including the present application): 09/840,936; 09/840,937; 09/841,000; 09/841,060; 09/841,061; 09/841,127; 09/841,128; 09/841,129; 09/841,130; 09/841,131; 09/841,170; 09/841,193; 09/841,194; 09/841,195; 09/841,238; 09/841,239; 09/841,240; 09/841,283; 09/841,284; 09/841,285; 09/841,286; 09/841,287; 09/841,288; 09/841,289; 09/841,290; 09/841,291; 09/841,292; 09/841,293; 09/841,294; 09/841,295; 09/841,296; 09/841,297; 09/841,298; 09/841,299; 09/841,300; 09/841,301; 09/841,302; 09/841,303; 09/841,304; 09/841,305; 09/841,306; 09/841,307; 09/841,308; 09/841,309; 09/841,310; 09/841,311; 09/841,312; 09/841,429; 09/841,430; 09/841,431; 09/841,432; 09/841,433; 09/841,434; 09/841,435; 09/841,436; 09/841,437; 09/841,438; 09/841,439; 09/841,440; 09/841,441; 09/841,442; 09/841,443; 09/841,444; 09/841,445; 09/841,446; 09/841,447; 09/841,448; 09/841,449; 09/841,488; 09/841,489; 09/841,490; 09/841,491; 09/841,492; 09/841,493; 09/841,494; 09/841,495; 09/841,496; 09/841,497; 09/841,498; 09/841,499; 09/841,500; 09/841,501; 09/841,502; 09/841,632; 09/841,633; 09/841,634; 09/841,635; 09/841,636; 09/841,637; 09/841,638; and 09/841,639.

Although the conflicting claims are not identical, they are not patentably distinct from other. For example; claim 528 (cancelled in this application, but still present in other applications) is an obvious variation of claim 2425. Note that claim 528 (as it depends from 491) only calls for "one or more" heat sources; rather than "at least two"; however this is deemed to be essentially the same because claim 491 also calls for superposition of heat: superposition inherently requires two sources. Claim 491 also includes the additional limitation of "layer" of the coal formation; however, it is well known that coal deposits occur in layers, thus this is not deemed to be a patentable distinction. Furthermore; although claim 2425 in the present application calls for the

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mixture to be produced as a vapor (which is not claimed in claim 528); this is well known and old in the art of coal gasification and pyrolysis; thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified claim 528 to have included a vapor as called for in claim 2425. It is also noted that at least one other application includes a set of claims which are substantially identical to the claims in this application; but which call for hydrocarbon containing formation rather than coal. Since applicant has defined hydrocarbon containing formation as including coal; this would be an obvious variation.

37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. The discussion below sets forth the Office's basis for its determination that each of these ninety one applications contains at least one claim that conflicts with another one of the related co-pending applications identified above. Each of these ninety one applications includes the same specification and collectively these ninety one applications present over five thousand claims. The Office has shown that each of these ninety one applications contains at least one claim that conflicts with another one of the related co-pending applications identified above, and an analysis of each of five thousand claims in the ninety one related co-pending applications would be an extreme burden on the Office requiring tens of thousands of claim comparisons. Therefore, the Office is requiring applicant to

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resolve the conflict between these applications and comply with 37 CFR 1.78(b) by either:

- (1) filing a terminal disclaimer in each of the related ninety-one applications terminally disclaiming each of the other ninety applications; or,
- (2) provide a statement that all claims in the ninety applications have been reviewed by applicant and that no conflicting claims exist between the applications. Such a statement must set forth factual information to identify how all the claims in the instant application are distinct and separate inventions from all the claims in the above identified ninety applications.

See MPEP 804.02 IV for a discussion of multiple double patenting rejections and the requirements for a single terminal disclaimer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 2424-2426, 2430-2449, 2457, 2458, 2460, and 2461 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 2424 is unclear regarding "at least about 7 heat sources". The modified "about" is not normally used in reference to an integer count (i.e., a number of sources); thus it is unclear what the scope of the claim is. Would "5" or "6" be considered to be "about 7"?

7. While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947). The term "hydrocarbon" is defined in the specification extremely broadly as: "organic material that contains carbon and hydrogen in their molecular structures" while the accepted meaning is "an organic compound containing only carbon and hydrogen." Applicant's definition of hydrocarbon is rather vague: would substances such as trona, gypsum, or carbonic acid be included in this definition of hydrocarbon? It is also noted that applicant's definition includes a plural for "molecular structures"; thus apparently leaving open the possibility of a mixture of a hydrogen containing substance and a carbon containing substance falling within the term "hydrocarbon". Applicant's vague definition of "hydrocarbon" is much broader than the accepted meaning of the term and this makes it impossible for one of ordinary skill in the art to ascertain the scope of the claims which include the term "hydrocarbon".

8. Claim 2433 calls for the heating energy to be equal to or less than Pwr. Pwr is defined using an ideal equation for heating. Since this equation fails to take into

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account the endothermic nature of pyrolysis reactions, and heat loss to adjacent formations; it is not clear how the heating energy can be equal to or less than  $P_{wr}$ .

9. Claim 2447 is unclear regarding "non-condensable component". It is noted that the specification provides a definition for "non-condensable hydrocarbon"; however it is not clear whether this definition applies to this component.

10. Claim 2458 is unclear regarding "substantially uniformly increasing a permeability". Does this mean "increasing a permeability *to a substantially uniform value*" or "increasing a permeability *by a substantially uniform amount*"?

11. Claim 2426 is unclear regarding "a pyrolysis temperature range". This is unclear because it does not specify the range. Some unstable compounds are known to pyrolyze at relatively low temperatures. Would a temperature of 35°C be considered to be within "a pyrolysis temperature range"?

12. Claim 2432 is unclear regarding "during pyrolysis". A step of pyrolysis has not been positively claimed, thus the scope of this claim is unclear.

13. Claim 2447 calls for the hydrogen to be between 10% and 80% of the non-condensable component by volume. The claim does not specify any other conditions such as pressure or temperature. It is noted that many such processes produce a mixture at high pressure. Although gases behave ideally near atmospheric pressure; the product gases of the claimed process deviate significantly from ideal gas law at high pressures. Furthermore, applicant's definition of "condensable" uses a reference of 25°C; although chemists usually refer to gas measurements at STP. There are some products of this process which condense between 25°C and STP. Such condensation



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would affect the relative volumes. Without any benchmark temperature and pressure, it is impossible to ascertain the scope of the claim with precision.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 2424-2426, 2430, 2434-47, 2457, 2458, and 2460 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. (U.S. Patent number 4,299,285) in view of Van Meurs, et al. (U.S. Patent number 4,886,118).

The Tsai reference teaches a method for treating a coal formation in situ comprising providing heat from one or more heat sources to at least a portion of the formation; allowing the heat to transfer from the one or more sources to a selected section of the formation; and producing a mixture from the formation through one or more production wells, wherein the heating is controlled such that the mixture can be produced as a vapor. The Tsai reference fails to teach the at least about 7 heat sources for each production well. Note that Tsai teaches: "*the principles are applicable to a multiple of interrelated injection and production wells*" (col. 2, line 8).

The Van Meurs reference teaches a similar in situ heating system, and further teaches that six or twelve heat sources for each production well significantly increases the production (col. 8, line 24).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Tsai method to have included at least about 7 heat sources disposed in the formation for each production well, as called for in claim 2424, in order to improve production.

With regards to claim 2425; the Tsai and Van Meurs references fail to explicitly teach the superposition of heat sources. It is apparent that one of ordinary skill in the art would know that the heat sources should be spaced to substantially heat the entire formation. Any configuration of heat sources that provides heat to the entire formation would inherently cause superposition of heat; thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included superposition of heat as called for in claim 2425; in order to ensure that the entire formation is heated.

With regards to claim 2426; the Tsai reference teaches a pyrolysis temperature range within a section of the formation (see col. 4, line 54).

With regards to claim 2430; the Tsai reference teaches a natural distributed combustor (see col. 2, line 32).

With regards to claim 2434; the Tsai reference does not explicitly teach the transferring by conduction; however this is inherent in a solid substance such as coal. Even though the bulk of the heating in the Tsai method may be done by convection; it is apparent that some unfractured coal must remain, and thus the allowing heat to transfer comprises transferring heat substantially by conduction (that is, substantially within the unfractured portions).

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With regards to claim 2435; the Tsai reference does not teach the thermal conductivity; however, it would have been further obvious to one of ordinary skill in the art at the time of the invention to have practiced the Tsai method in a coal seam having a thermal conductivity of greater than about  $0.5\text{W}/(\text{m}^{\circ}\text{C})$  as called for in claim 2435; such a formation would be a desirable choice because it would heat more uniformly.

With regards to claims 3436-3447; the nature of hydrocarbons produced from such heating is highly variable, and dependent upon many factors, not least of which is the characteristics of the coal. The components of the produced mixture are deemed to be the results of design variables, including coal characteristics and temperature. Also, specifically with respect to claims 2439-2441; hydrocarbons produced using the Tsai method inherently have less than 1% nitrogen, oxygen, or sulfur.

With regards to claims 2457 and 2458; the Tsai reference teaches the permeability greater than about 100 md in table 1. The uniform increase in permeability is inherent.

With regards to claim 2460; the Van Meurs reference teaches the heat sources surrounding the production well; since this includes at least 3 sources this inherently includes a triangle. It would have been further obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included at least 3 sources in a triangle as called for in claim 2460, in order to increase production.

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15. Claim 2431 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai and Van Meurs as applied to claim 2424 above, and further in view of Elkins (U.S. Patent number 2,734,579).

The Tsai and Van Meurs references fail to teach the controlling the temperature and pressure wherein the temperature is controlled as a function of the pressure or the pressure is controlled as a function of the temperature.

Elkins teaches controlling the pressure in order to lower the temperature (col. 3, line 46); this is done in order to help prevent overheating. It would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai process to have included the temperature is controlled as a function of the pressure or the pressure is controlled as a function of the temperature as called for in claim 2431, and as taught by Elkins, in order to prevent overheating.

16. Claims 2432 and 2433 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. and Van Meurs, et al. as applied to claim 2424 above, and further in view of Kasevich, et al. (U.S. Patent number 4,457,365).

The Tsai and Van Meurs references fail to teach the heating rate. With regards to claim 2433; it is known to heat at rates of less than 10°C per day, as shown by Kasevich (figure 3). It is apparent that this low heating rate is desirable because it results in more uniform heating, and reduces the possibility of hot spots. It would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included heating at a rate of less than about 10°C per

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day as called for in claim 2433, in order to achieve more uniform heating. The claim limitations drawn to the heating energy are nothing more than well known thermodynamic equations.

With regards to claim 2432; it is noted that Kasevich teaches an average of approximately  $1.6^{\circ}/\text{day}$ . It is apparent that when the temperature reaches its highest point (the point at which pyrolysis occurs) the rate of increase would be at the slowest; thus it would be less than about  $1^{\circ}\text{C}/\text{day}$ . It would have been further obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included heating at less than about  $1^{\circ}\text{C}/\text{day}$  during pyrolysis as called for in claim 2432; in order to achieve more uniform heating.

17. Claim 2461 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. and Van Meurs, et al. as applied to claim 2424 above, and further in view of Salomonsson (U.S. Patent number 2,914,309).

The Van Meurs and Tsai references fail to explicitly teach the unit of heat sources in a triangular pattern and the plurality of units in a repetitive pattern. It is noted that the Van Meurs reference teaches the heat sources surrounding the production well, which would inherently include a triangular pattern.

Salomonsson teaches that it is desirable to have a repetitive pattern in order to cover the area evenly. It is apparent that this is beneficial in order to prevent hot spots.

It would have been further obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included a unit of a

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triangular pattern and a repetitive pattern of units as called for in claim 2461; in order to cover the area evenly.

18. Claims 2448 and 2449 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. and Van Meurs, et al. as applied to claim 2424 above, and further in view of Stoddard, et al. (U.S. Patent number 4,463,807).

The Tsai and Van Meurs references fail to explicitly teach the ammonia.

It is well known that ammonia is a byproduct of such heating of coal. This is taught by Stoddard. It is readily apparent that the amount of ammonia is dependent on many design factors, including the formation characteristics (hydrocarbon content, etc.). It would have been obvious to one of ordinary skill in the art at the time of the invention to have practiced the Tsai method, as modified, in a formation with characteristics allowing greater than 0.05% of the produced mixture to be ammonia, as called for in claim 2448.

With regards to claim 2449; it is well known that one of the chief uses for ammonia is fertilizer; thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have used ammonia produced from the coal seam for fertilizer as called for in claim 2449.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Kreck whose telephone number is (703)308-2725. The examiner can normally be reached on 6:30-3:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Heather Shackelford can be reached on (703)308-2978. The fax phone

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numbers for the organization where this application or proceeding is assigned are (703)305-3597 for regular communications and (703)305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)306-4177.

JJK  
May 13, 2002

  
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